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SERVICE MANUAL

COMPUTERIZED FULL AUTOMATIC/ MUSIC SELECTION TURNTABLE

SANSUI XR-Q11

Sansui

SANSUI ELECTRIC CO., LTD.

SPECIFICATIONS

Type	Two-speed direct-driven
Speeds	33-1/3, 45 rpm
Platter	Aluminum alloy die-cast 350 mm (13-3/4") diameter, 1.7 kg (3.74 lbs)
Motor	DC Brushless servo-type (Quartz-servo)
Wow and flutter	Less than 0.022 % (WRMS) Less than 0.015% (WRMS-read out direct at the FG output)
S/N	Better than 62 dB (IEC-B)
Rumble	Better than 78 dB (DIN-B)
Tonearm	Statically balanced type
Tonearm length	245 mm (9-11/16")
Overhang	16 mm (5/8")
Optimum cartridge weight When the headshell supplied is employed	4 ~ 10 g
Dimensions	483 mm (19") W 142 mm (5-5/8") H 420 mm (16-9/16") D
Weight	12.5 kg (27.5 lbs) net 14.5 kg (31.9 lbs) packed
Power consumption	33 W

- The power voltage is adjusted to the one of the area where you bought the unit.

Specifications of the cartridge

Model SV-101

Type	Dual magnet
Frequency response	10 ~ 20,000 Hz
Output voltage	2.5 mV per channel (1,000 Hz, 35.4 mm/sec)
Load impedance	47 kΩ
Tracking force	2 g
Stylus	0.6 mil, diamond spherical (SN-101)

*** Design and specifications subject to change without notice for improvements.**

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1. OPERATION

The XR-Q11 is a computerized full automatic music selection turntable in which a mechanism that can automatically select any music on a record disc at random is newly assembled into the XR-Q9.
Refer to FR-D4/D4K SERVICE MANUAL, "Description of Operation", Section 2-2, for operations of the automatic mechanism assembly and descriptions of the arm position sensor and lifter position sensor.
The control circuits for XR-Q11 can mainly be divided into a servo circuit to control a DD motor and a microcomputer and its peripheral circuit to mainly control a tonearm.
Refer to XR-Q9 SERVICE MANUAL, Page 4, for operation of the servo circuit, since the operation is entirely the same as in the XR-Q9.

1-1. Basic circuit configuration for full automatic operation (See Block Diagram on Page 2.)

A. Microcomputer

The microcomputer μPD-546-150 controls the operations of the tone arm, lifter, and DD motor in such a way that every control signal is output to the corresponding output port after each of signals applied to the input ports has been executed in accordance with a program stored in the microcomputer memory.
The microcomputer becomes enable only when the output ports are at H level in potential; in other words, every circuit connected to pins (at H level) of the microcomputer operates.

B. Input peripheral circuits for the microcomputer

1. Control switches

These are manual operation switches to perform the full automatic operation. Since the control switches are dynamic-connected to the ports of the microcomputer, if a control switch is pushed, two input/output pins are connected to each other in the microcomputer and thereby the microcomputer begins to operate. (See Block Diagram.)

2. A sensor and the sensor circuit

In operation with the B sensor, the A sensor detects the tonearm positions necessary for automatic operation. In other words, the A sensor detects the lead-in position of a 30 cm-or 17 cm-size record disc and also detects whether the tonearm rests on the arm rest (A x B = 1) or not (A x B ≠ 1).

The tonearm positions (A x B = 1 and A x B ≠ 1) have the following relations to the start/stop switch:

- **If start/stop switch is set to start (The turntable is at a stop)**

Arm Position	Lifter Position	Operation of Turntable	Automatic Operation
On the rest (A x B = 1)	Up (D = 1)	Rotates after 200ms	In-operation
Same as above	Down (C = 1)	Imm'ly rotates	In-operation after D = 1 in CW
On the record disc (A x B ≠ 1)	Up (D = 1)		To C = 1 in CW
Same as above	Down (C = 1)		

- **If start/stop switch is set to stop (The turntable is in motion and also in automatic operation.)**

Arm Position	Lifter Position	Operation of Turntable	Automatic Operation
On the rest (A x B = 1)	Up (D = 1)	Imm'ly stops	
Same as above	Down (C = 1)		
On the record disc (A x B ≠ 1)	Up (D = 1)	Stops at point AB	Arm return
Same as above	Down (C = 1)		Arm return

- **If start/stop switch is set to stop (The turntable is in motion and also in automatic operation.)**

Arm Motion Status	Automatic Operation	Operation of Turntable
During up motion (A x B = 1)	Out of automatic operation at D = 1	Imm'ly stops
During up motion (A x B ≠ 1)	Arm return after D = 1	Imm'ly stops at point AB
During horizontal motion (A x B = 1)	Imm'ly out of automatic operation	Imm'ly stops
During horizontal motion (A x B ≠ 1)	Arm return in CCW → CW or in CCW	Stops at point AB
During down motion (A x B ≠ 1)	Arm return after D = 1	Same as above
During return motion	Disable	

Note: In the above lists, A x B = 1, D = 1, and C = 1 mean the states in which the sensors B, C, and D are detecting the corresponding signals, respectively, on the timing chart. CW means that the micromotor rotates clockwise; CCW means that the micromotor rotates counterclockwise. Refer to the respective sections for operations of the sensors A, B, C, and D and the micromotor.

The signal detected by A sensor is applied to the input terminal 33 of the microcomputer through IC_{01a} and IC_{01b}.

3. B sensor and the sensor circuit

In cooperation with the A sensor, the B sensor detects the tonearm position and the end detection signal in the record lead-out groove after finishing over play.
The signal detected by the B sensor is applied to the input terminal 34 of the microcomputer through transistor Q1, and IC_{1d}.

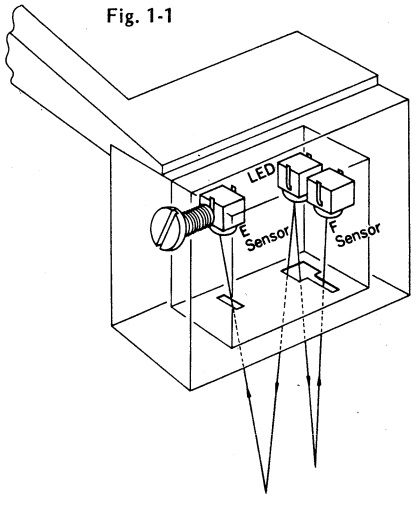
4. C sensor, D sensor and the sensor circuits

The C and D sensors comprise a lifter cam and a microswitches, respectively. The C sensor detects the down-position of the lifter; the D sensor detects the up-position of the lifter.
In both the sensors, the terminals 1 and 2 of the micro-switches are shorted to each other whenever the lifter states are detected.

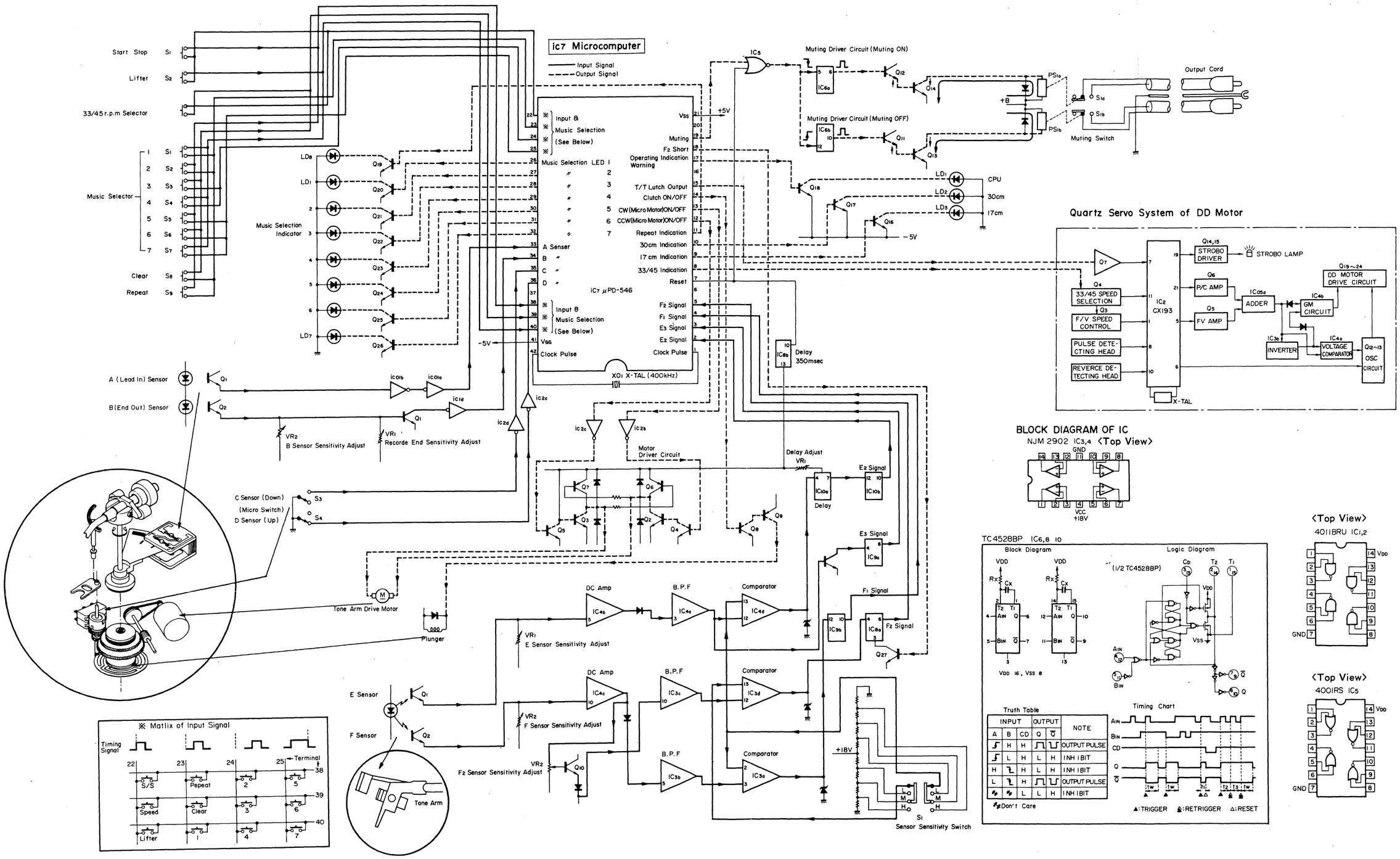
5. E sensor and F sensor

The E and F sensors mounted within the head shell feed into the microcomputer the signals necessary for automatic disc size selection and automatic music selection. In other words, in order to implement complex full automatic operations, both the sensor signals are fed into the computer after being discriminated into E_2, E_3, F_1, and F_2, respectively, through appropriate circuits.
The arrangement of the D and F sensors is shown in Fig. 1-1, and E sensor is called a leading sensor because E sensor first detects the signal.

Fig. 1-1



2. BLOCK DIAGRAM

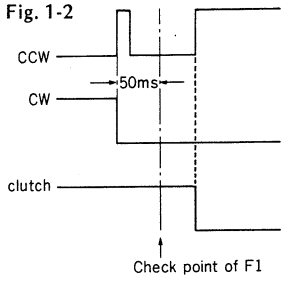


1) <E_2 Signal>
The E_2 signal is a signal to count the necessary number of modulate tracks so that the tonearm may come down onto a desired music in automatic music selection operation.
At the moment when the E sensor first detects a desired lead-over groove (marker space) and the E_2 signal next rises up (⌐), the tonearm stops moving and begins coming down onto it.
As shown in Block Diagram, the circuit includes a monostable multivibrator to generate a pulse with a fixed pulse width, and the pulse is applied to the microcomputer.

2) <E_3 signal>
The E_3 signal is a signal to detect the disk sizes and the presence or absence of a record disc. When the E sensor detects the circumference of a record disc during the lead-in motion of the tonearm, E_3 signal is generated. When the E_3 signal is generated (E_3 = 1) and the A sensor signal rises up (⌐), the disc size selection of 30 and 17 cm is achieved. Also, while the A sensor generates the signal (A = 1), if E_3 signal is generated, the disc selection of 30 and 17 cm is achieved in the same way.
If E_3 = 1 and A = 1 are not attained at the same time, this indicates that no record disc is mounted on the turntable.
In the case of whole-music play, the tonearm comes down by the E_3 signal or the rise up (⌐) of the A signal. Also, in automatic music selection operation, the sizes and the presence or absence of a record disc are detected. If the first selected music is in the first music section on a record disc, the operation is the same as in the whole-music play operation.
The circuit is shown in Block Diagram. The detection sensitivity of the circuit generating E_3 is set to be higher than that of the circuit generating E_2. In addition, the sensitivity of the E sensor is adjustable with a variable resistor, and the delay time of the E_2 signal is also adjustable.

3) <F_1 signal>
The F_1 signal is a signal to perform muting and to control F_2S (a signal to control F_2 signal) in automatic music selection operation.
In the case when the tonearm stops in a lead-over groove (a marker space) for a music on or after the second modulated tracks during automatic music selection, F_1 = 1 is obtained; in the case when the tonearm stops in a modulated groove, F_1 = 0 is obtained.
As shown in Block Diagram, the circuit is made up of a sensor, a DC amplifier, a band pass filter, a comparator, and a monostable multivibrator.
Fig. 1-2 shows a check point for the F_1 signal.

Fig. 1-2



- At a point 50 ms later than the horizontal motion stop position (Where CW changes from 1 to 0), the computer detects whether the F1 signal is "1" or "0".

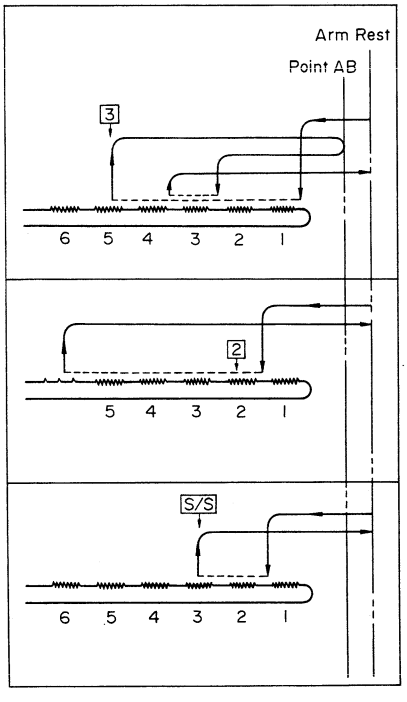
4) <F_2 signal>
The F_2 signal is a signal generated when the F sensor detects the lead-over groove (marker space) while the stylus is on a record disc, that is, during tracing, while the E_2, E_3 or F_1 is detected only when tonearm rises up.
The functions of the F_2 signal are as follows:
(1) To count the numbers of music tracks, by using the rise-up (⌐) of the F_2 signal, in order to perform automatic music selection.
(2) To release the muting when the lead-in horizontal motion of the tonearm stops in automatic music selection.
That is to say, the muting is released by the rise up (⌐) of the F_2 signal if F_1 = 0.
(3) To detect the end of the last track during automatic music selection. When the last music on a record disc is selected, the tonearm begins to return immediately after the last lead-over groove (lead-out groove) is detected by the rise up (⌐) of the F_2 signal.

1-2. Basic Operating of Automatic Music Selections

Switch Play #1
When pushing SW [3] during non-programmed play.
(Program is cleared after return-motion.)

Switch Play #2
When pushing SW, [2] or [clear], during play of track [2].
(The remaining record tracks are sifted to standard order.)

All Clear
[2]→[3]→[5]→[S/S]
When pushing SW, [S/S], during play of a track.
(Program clear)

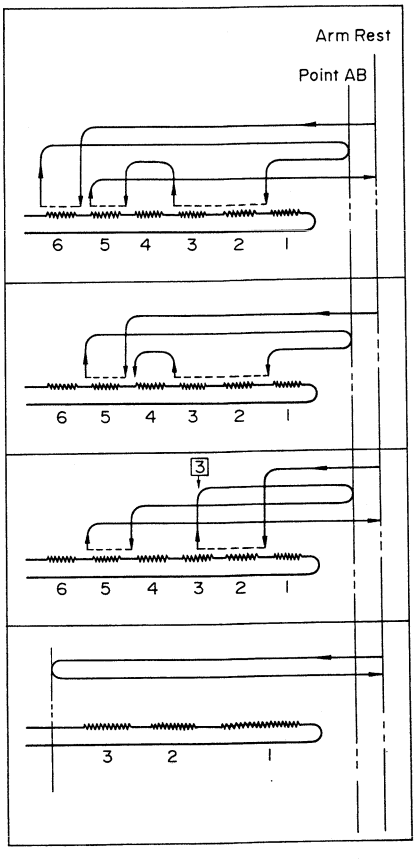


Random Cue
[6]→[2]→[3]→[5]→[S/S]
(Program is cleared after return-motion.)

Random Cue
(Repeat Play)
[5]→[2]→[3]→[REPEAT]→[S/S]

Skip Play
[2]→[3]→[5]→[S/S]
When pushing SW, [3] during play of track [3]
(Program is cleared after return-motion.)

Mistaken Pushing Erroneous Detection
(Same way if not a disc.)
[5]→[S/S]
(Warned flickering, repeat released, program latched)



6. Music sensitivity switch

Complex and accurate operations are required for the automatic music selection on a record player. The difference in pitch between the lead-over grooves (marker spaces) among various disks or the like may result in an error operation such as a misplacing of the tonearm lifter-down position. Therefore, a sensor sensitivity switch is necessary for adjusting the sensitivities of E_2, F_2, and F_1 signals at the same time.

In this circuit as shown in Block Diagram, the reference voltages applied to the comparators are adjusted into three levels by using the sensor sensitivity switch.

C. Output peripheral circuits for the microcomputer

1. Micromotor control circuit

When the micromotor rotates clockwise, the tonearm makes a return motion and the lifter makes an up-and-down motion. On the other hand, when the micromotor rotates counterclockwise, the tonearm makes a read-in motion and, in addition, the lifter makes an up-and-down motion when the lifter switch is pushed again while the lifter is in motion.

2. Plunger control circuit

The plunger engages a clutch plate with a TA drum in the automatic mechanism assembly, and the micromotor drives the arm and the slit plate.

To control the plunger, the output from the microcomputer output pin 14 is used through the transistors Q_8 and Q_9.

3. 33/45 rpm selector and the indicator

The 33/45 rpm selector controls the output from the microcomputer output pin 8. The output from the pin 8 is supplied to the IC_4 (CX193) through the DD servo circuit Q_4 (33/45 speed selection) to switch the divide ratio. In addition, a common-anode seven-segment LED (SL1272) is connected to the terminal No. 8 through a driver circuit board, S0052 having transistors Q_8, Q_9, Q_{10}, Q_{11}, Q_{16}, and Q_{17}. This LED indicates both 33/45 rpm; however, 33 rpm is automatically indicated when the power switch is turned ON. If the 33/45 rpm selector is pushed the indication next changes to 45 rpm.

4. DD motor start/stop pulse generator

If the start/stop switch is pushed, a H-level pulse is generated at the microcomputer output pin 15, and is applied to the transistor Q_7 on the circuit board S0052. And, if the pin 7 of the quartz servo IC (CX-193) is changed to L-level, the turntable begins to rotate.

5. Music selection indicator circuit

In automatic music selection operation, this circuit is used to store selected track into the microcomputer memory and to indicate them.

During play, an indicator for a music which is now in the play flickers as follows:

(1) When the tonearm lead-in motion is stopped in a modulated groove, the indicator begins to flicker at the moment when the lead-over groove (the marker space) is detected (by the rise up (⌐) of F_2 signal).

(2) When the tonearm is stopped in a lead-over groove, the indicator begins to flicker at the moment when the micromotor stops (by the trailing edge (¬) of CCW signal.)

(3) During the sequential music play, the indicator begins to flicker at the moment when the lead-over groove is detected. (by the rise up (⌐) of F_2 signal.) In these operations of above (1), (2) and (3) the flickering period of time is 1.5 sec.

6. Computer operation indicator circuit

The output generated from the computer output pin 17 drives the transistor Q_{18} so as to perform switching action for flickering indication.

The indicator is flickered, only when the output level of CW or CCW is "1", with a periodic time of 2.5 Hz. In addition, in the case of a miss program such that only a track number which is not included on a record disc is selected or in the case of the absence of a record disc, the indicator begins to flicker with a periodic time of 9 Hz from when the tonearm begins to return. This warned flickering is kept for 20 sec, but can be released by turning the AC switch OFF, the clear switch ON, start/stop switch ON. or when the tonearm passes through point AB in manual lead-in operation.

7. Muting circuit

The muting circuit is a circuit to short the outputs of the player, where necessary.

The circuit configuration is shown in Block Diagram. The plunger driver has two circuits: one provided with IC_{6a}, Q_{12}, Q_{14}, and PS_{1a} to turn the muting operation ON, and one provided with IC_{6b}, Q_{11}, Q_{13}, and PS_{1b} to turn the muting operation OFF.

The conditions under which the muting is operated are described below:

(1) In automatic music selection operation and manual lifter operation, if the lifter is down ($C = 1$), the muting is OFF; if the lifter is up ($C \neq 1$), the muting is ON.

(2) In automatic music selection operation (See Timing Chart 1), when the tonearm lead-in horizontal motion is stopped, if $F_1 = 1$ (the stylus is in a lead-over groove) the muting is turned OFF 1.7 sec after the lifter begins to come down ($D = 1 \rightarrow 0$); if $F_1 = 0$ (the stylus comes down in a modulated groove) the muting is turned OFF at the moment when the lead-over groove is detected by the rise up (⌐) of F_2 signal.

8. F_2S generator

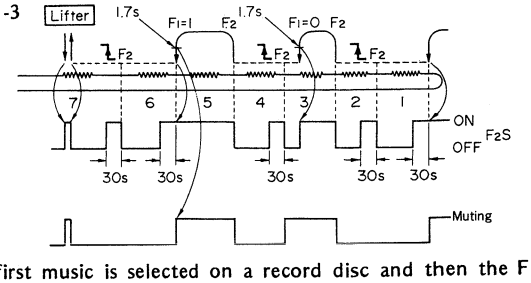
This generator is a circuit to generate a F_2S signal to short the F_2 signal so that the signal can not be input to the microcomputer.

The F_2S (F_2-shorting signal) is the signal to prevent error operation caused by detecting many F_2 signals in the lead-over grooves (marker spaces). In other words; this circuit is provided to remove unnecessary F_2 signals from among a number of detected F_2 signals.

In this circuit as shown in Block Diagram, the output from the computer pin 18 is applied to the pin 3 of a monostable multivibrator IC_{8a} through a transistor Q_{27}, so that the F_2 output is shorted.

Referring to Fig. 1-3, the conditions under which the F_2S signal operates are described below.

Fig. 1-3



(1) The first music is selected on a record disc and then the F_2S signal is turned off 30 sec after the lead-in operation is completed ($C = 0 \rightarrow 1$).

(2) A music on and after the second modulated track on a record disc is selected, and in the case when the lead-in operation is completed, the F_2S signal operates, in accordance with the position at which the tonearm horizontal motion is stopped, as follows:

a) If the stylus tip is in the modulated groove ($F_1 = 0$), the F_2S signal is turned off 1.7 sec after the tonearm comes down ($D = 1 \rightarrow 0$).

b) While the stylus is tracing the groove, the F_2S signal is turned on for 30 sec after the rise-up (⌐) of the F_2 signal is detected.

c) If the stylus comes down onto the lead-over groove ($F_1 = 1$), the F_2S signal is turned off 30 sec after the tonearm comes down ($C = 0 \rightarrow 1$).

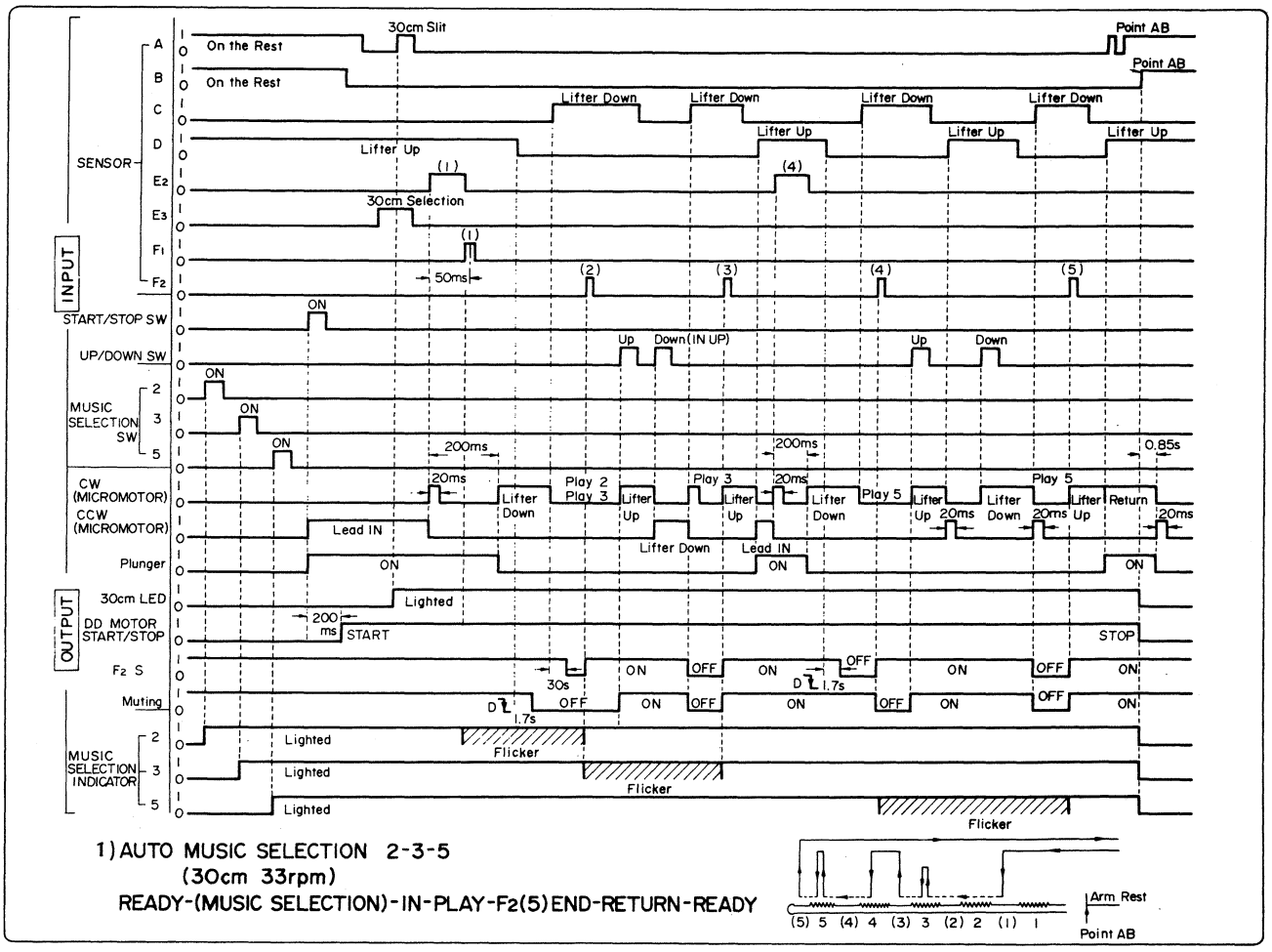
(3) In the case when the music are played continuously in automatic music selection, the F_2S signal is turned ON for 30 sec after the F_2 signal rises up in the lead-over groove.

(4) In the case when music selection is erased while the F_2S signal is ON for 30 sec, and next when the subsequent music selection operation is made, the state in which the F_2S signal is turned ON for 30 sec is released.

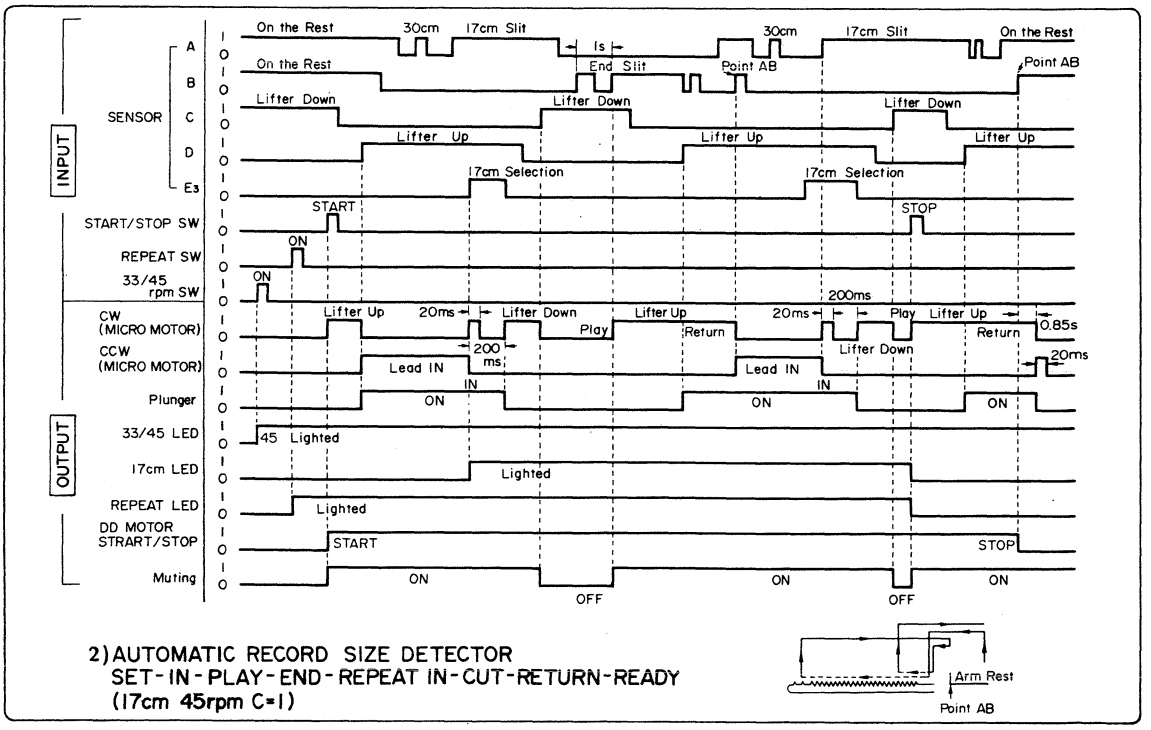
(5) In the case when the lifter is manually operated in automatic music selection play, the F_2S signal is turned on at C = 0 and off at C = 1.

At a point 50 ms later than the horizontal motion stop position (where CW changes from 1 to 0), the computer detects whether the F_1 signal is "1" or "0".

1-3. Microcomputer Timing Chart



1) AUTO MUSIC SELECTION 2-3-5
(30cm 33rpm)
READY-(MUSIC SELECTION)-IN-PLAY-F2(5)END-RETURN-READY



2) AUTOMATIC RECORD SIZE DETECTOR
SET-IN-PLAY-END-REPEAT IN-CUT-RETURN-READY
(17cm 45rpm C=1)

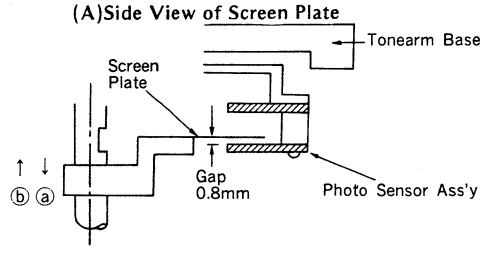
3. ADJUSTMENTS

3-1. Adjustment of Screen Plate Installation Position

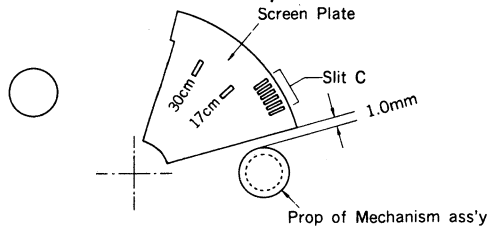
Adjust the position whenever the tonearm is replaced. With the tonearm placed on the arm rest, install the screen plate to the tonearm shaft, as shown in Figs. 3-1 (A) and (B).

Fig. 3-1 Installation of Screen Plate

(A)Side View of Screen Plate



(B)Bottom View of Screen Plate
Note: Tonearm is placed on its rest

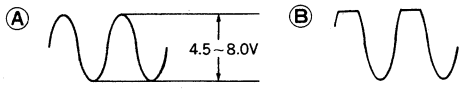


3-2. Adjustment of B Sensor Output

A. Output level adjustment

(1) Connect the + terminal of an oscilloscope to the TP_1 of S0053 and − terminal to the TP_3, and set the selector switch DC/AC to DC and the test ranges to 2 V/div and 10 msec/div.
(2) Shift the tonearm by hand to the lead-out groove on the record disc, and slowly move the tonearm right and left in such a way that it takes about two seconds for the slit C of Fig. 3-1 to pass through between the LED and the phototransistor.
(3) During this movement, adjust the output level by rotating the volume (VR_2) of S0061 so as to be set between 4.5 and 8 V without any distortion of the waveform, as shown in Fig. 3-2.
(4) If it is impossible to adjust the output level to 4.5 V or more, reduce the gap distance between the screen plate and the photo sensor assembly to 0.8 mm or less, as shown in Fig. 3-1.

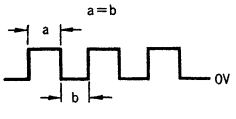
Fig. 3-2 Output Waveform Adjustment on B-Sensor



B. Duty ratio adjustment of output pulse waveform

(1) Connect an oscilloscope across the TP_4 of S0061 and GND, and set the selector switch to DC and the test ranges to 2 V/div and 0.1 sec/div.
(2) Shift the tonearm by hand to the lead-out groove on the record disc, and slowly move the tonearm right and left in such a way that it takes about two seconds for the slit C of Fig. 3-1 to pass through between the LED and the phototransistor.
(3) During this movement, adjust the duty ratio of the output pulse waveform by rotating the volume (VR_1) of S0053, as shown in Fig. 3-3.

Fig. 3-3



3-3. Lead in Adjustment

By using 30 cm and 17 cm sized records having a narrow lead-in groove portion, actually carry out the lead-in operation. Adjust the adjust cam ㊾ (See Exploded View of Mechanism Ass'y on Page 13) so that the stylus tip may come down to the middle of the lead-in groove. Be sure that the slit plate is fit to the tonearm as shown in Figs. 3-1 (A) and (B). In this case, if the stylus point is required to be led-in outside, rotate the adjust cam clockwise.

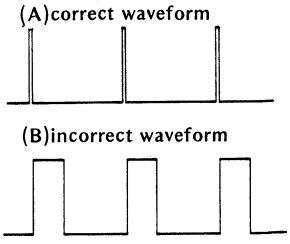
3-4. Rev. Speed Adjustment (PLL adjustment)

Note: 1) Make sure to carry out the speed adjustment at 45 rpm before carrying out the speed adjustment at 33 rpm.
2) Make sure to carry out the adjustment with a rubber sheet on.

A. How to adjust with an oscilloscope

(1) Connect oscilloscope leads across the TP_3 of S-0052 and the GND, and set the test ranges to 2V/div. and 0.5 msec./div.
(2) Set the speed selector to 45 rpm.
Adjust the oscilloscope waveform to the one shown in Fig. 3-4 (A) by rotating the VR_1 (S-0052). In this case, make the pulse width as narrow as possible.
(3) Set the speed selector to 33 rpm.
Adjust the oscilloscope waveform to the one shown in Fig. 3-4 (A) by rotating the VR_2 (S-0052).

Fig. 3-4



B. How to adjust without an oscilloscope

(1) Set the speed selector to 45 rpm.
Bring the strobo pattern movement to a stop, by rotating the VR_1 (S-0052).
(2) Set the speed selector to 33 rpm.
Bring the strobo pattern movement to a stop, by rotating the VR_2 (S-0052).

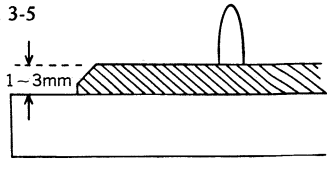
3-5. Electronic Brake Adjustment

Connect DC volt meter leads across the TP_5 and the TP_6, then make the set operate. Adjust the voltage across the TP_5 and the TP_6 to 0.55V, by rotating the VR_3 (S-0052).

3-6. Platter Height Adjustment

(1) Place the turntable horizontally.
(2) Adjust the front, right, and left sides of the platter and the cabinet as shown in Fig. 3-5, by rotating the screw No. 8 (See Top View on Page 13). In this case, a height difference among the front, right and left must be within 1 mm.

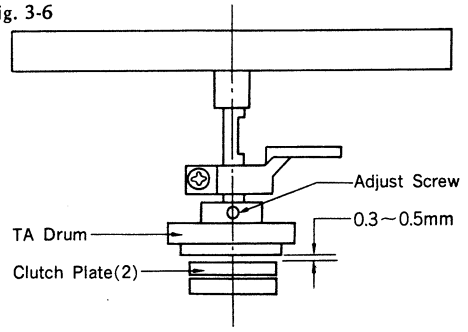
Fig. 3-5



3-7. Gap Adjustment between TA Drum and Clutch Plate (2)

When the automatic mechanism assembly parts such as the tonearm assembly, slit plate, TA drum, or clutch plate are replaced with new ones, adjust a gap between the TA drum and the clutch plate so as to be 0.3 to 0.5 mm as shown in Fig. 3-6. (It is possible to assemble the arm base with the automatic mechanism assembly installed in the cabinet.)

Fig. 3-6

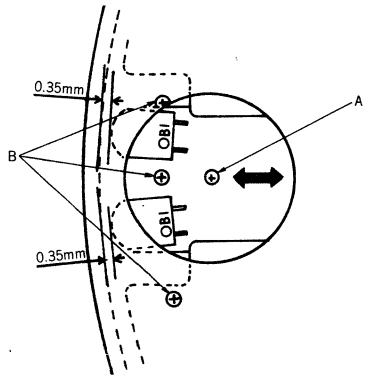


3-8. Gap Adjustment between Pulse Detecting Head and Platter (See Fig. 3-7)

Note: Adjust the gap when the pulse detecting head ass'y or the platter is replaced with a new one.

Put an appropriate spacer between the pulse detecting head and the platter, and install the head with screws so that the gap may become 0.35 mm. (The three sheets of this Service Manual paper cover are approximately 0.35 mm in thickness.)

Fig. 3-7



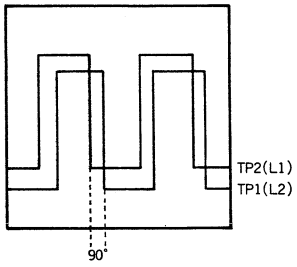
3-9. Phase Adjustment between Pulse Detecting Heads (See Fig. 3-8)

Note: The pulse detecting head Ass'y is supplied as to be adjusted the distance between the heads ($L_{1,2}$).
Avoid to carry out this adjustment without dual trace oscilloscope.

(1) Connect oscilloscope across TP_2 and GND, TP_2 and GND, then make the set operate.

(2) Adjust the pulse detecting head adjusting screw B (See Fig. 3-7), that the signal generated from L_1 may lag signal generated from L_2 by a phase angle of 90°.

Fig. 3-8



3-10. Adjustment of Automatic Music Selection Operation

● Required disk and measuring instruments

(1) Tester (DC voltmeter)
Input impedance: 50 kohm/V or more. (The higher, the better)

(2) A vinyl chloride record disc without grooves or with wider lead-over grooves than are usual.

(3) A record disc with narrower lead-over grooves or moderately-wide lead-over grooves (less than 0.5 mm) near a position 70 ~ 75 mm away from the disc center. The record is desirable in which many musics about (seven music tracks) are recorded.

(4) A rule with graduation marks starting from the edge.

A. Height adjustment of E and F sensor

1. **Objective**
Accurate adjustment of the heights from the record disc surface to the E and F sensor is required so that both the sensors can perfectly perform the sensor operation.
(Make sure to perform this adjustment when using a turntable sheet other than Q-11.)

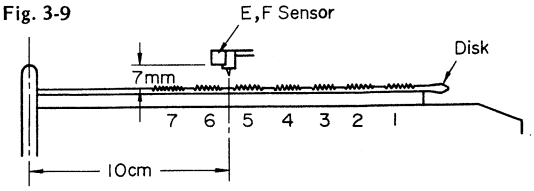
2. **Jig used**
Use a rule explained above (4).

3. **How to adjust (See Fig. 3-9)**

a) At the lifter-up position, adjust the height to 7 ±0.5 mm by rotating the arm lifter height adjusting screw (B in Picture, Top View on Page 13).

b) At the lifter-down position, check that the height is 3.5 mm. (This height should be adjusted by using the cartridge mounting spacer.)

Fig. 3-9



B. Sensitivity adjustment of E and F sensor

1. **Setting**
At the lifter-up position, in case of a record disc without grooves, stop the stylus at a position about 10 cm away from the disc center. In case of a record disc having grooves, stop the stylus at a lead-over groove about 10 cm away from the disc center, as shown in Fig. 3-9.

2. **How to adjust (See the picture, Bottom View on Page 13)**

a) Connect the DC voltmeter across the TP_5 of S0053 and the ground, and then adjust the voltage to DC5 V by rotating the volume (VR_1) of S0056. (E sensor adjustment)

b) Connect the DC voltmeter across the TP_6 of S0053 and the ground, and then adjust the voltage to DC5 V by rotating the volume (VR_2) of S0056. (F sensor adjustment)

Note: When adjusting both the sensors with the stylus stopped on a lead-over groove of an ordinary record disc, note that there is a difference in detection position between E sensor (leading sensor) and F sensor.

C. Level adjustment of F_2 signal (See the picture, Bottom View on Page 13.)

1. **Setting**
Set the stylus in the same way as described under Section 2, and then move the lifter downward. (Check that the stylus stays on a lead-over groove.)

2. **How to adjust**

a) Connect the DC voltmeter across the TP_7 of S0053 and the ground, and then adjust the voltage to DC5 V by rotating the volume (VR_2) of S0053.

D. Lateral-direction adjustment of E and F sensor

1. Objective

Since there is a distance between the stylus tip and the F sensor as shown in Fig. 3-11, when the stylus is moved by hand shifting from the outward to the inward grooves, there arises a difference in position between the stylus and the F sensor, as shown in Fig. 3-10. Therefore, it is necessary to minimize this difference on the record disc on an average.

In this case, the optimum adjustment guideline is to adjust the stylus so as to be located at a position 1.1 mm outward from the line which connects the F sensor and the stylus, as shown in Fig. 3-11.

Fig. 3-10

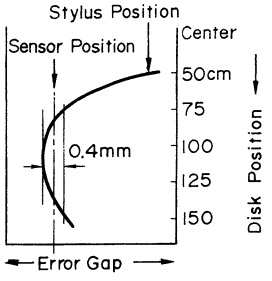
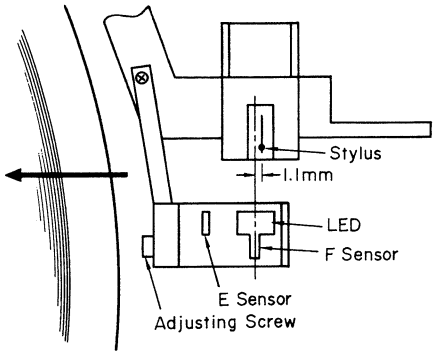


Fig. 3-11



2. Setting

a) Mount a record disc explained under (3).

b) Set the sensitivity selection switch to H when the lead-over groove is narrow, and to M when medium.

3. How to adjust (See Fig. 3-12)

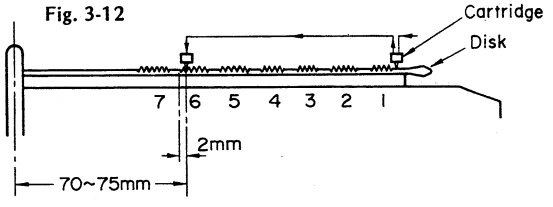
a) Push the music selection switch for the first music, and also the start/stop switch.

b) Immediately after the stylus begins to come down, move the arm by hand so that the stylus may trace the disc groove beginning from a position 2 mm or more outward from the lead-over groove about 70 mm away from the disc center.

c) Immediately after the above tracing, push the lifter switch twice. Be sure to push it with a time interval of 1 sec or more, because of a ready operation to receive F_2 signal.

d) Adjust the positions of E and F sensor by rotating the adjusting screws so that the muting switch can be turned ON (a click sound of plunger action is heard) when the stylus has passed through the lead-over groove. If the muting switch is turned ON earlier, rotate the adjusting screw counterclockwise to turn ON the switch later. (The thread pitch is 0.4 mm.)

Fig. 3-12



Note: The adjustment procedure described above has the following reasons:

*1 The detection operation for the beginning of a music track can be omitted.

*2 The stylus is made to shift from the outside to the center by hand so as to check that the stylus may come down onto the respective positions almost the same distance away from the respective lead-over grooves on the disc whenever the respective musics are selected.

*3 Twice pushes of the lifter switch can release F_2S signal.

E. Delay adjustment of E_2 signal

(See the picture, Bottom View on Page 13.)

1. Objective

a) Since the E sensor is located about 3 mm before the stylus, it is necessary to electrically delay the signal from the E sensor.

b) Since some of the mechanical parts are moved with accuracy of the order of milliseconds, it is necessary to adjust error due to mechanical operation.

c) Since detection error occurs due to an eccentricity of the record disc, it is necessary to adjust the error.

2. Setting

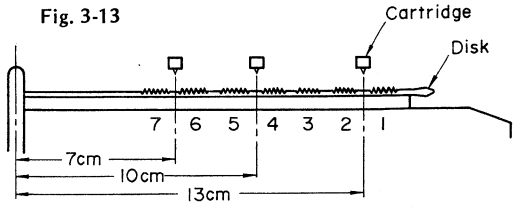
a) Use the record disc explained under (3), and select three music tracks having lead-over grooves, respectively, near positions 70 mm, 100 mm, and 130 mm away from the disc center.

3. Adjustment (See Fig. 3-13)

a) Perform the respective lead-in operations for three selected music tracks, and adjust the operations by rotating the volume (VR_1) of S0055 so that the stylus comes down on or a little before the lead-over grooves for the three music tracks. If the volume (VR_1) is rotated clockwise, the lift-down position of the stylus is shifted inward.

However, if the stylus comes down before the lead-over grooves, be sure that the muting switch is turned off within 20 sec after the stylus moves down. The muting time from 3 to 6 sec is desirable.

Fig. 3-13



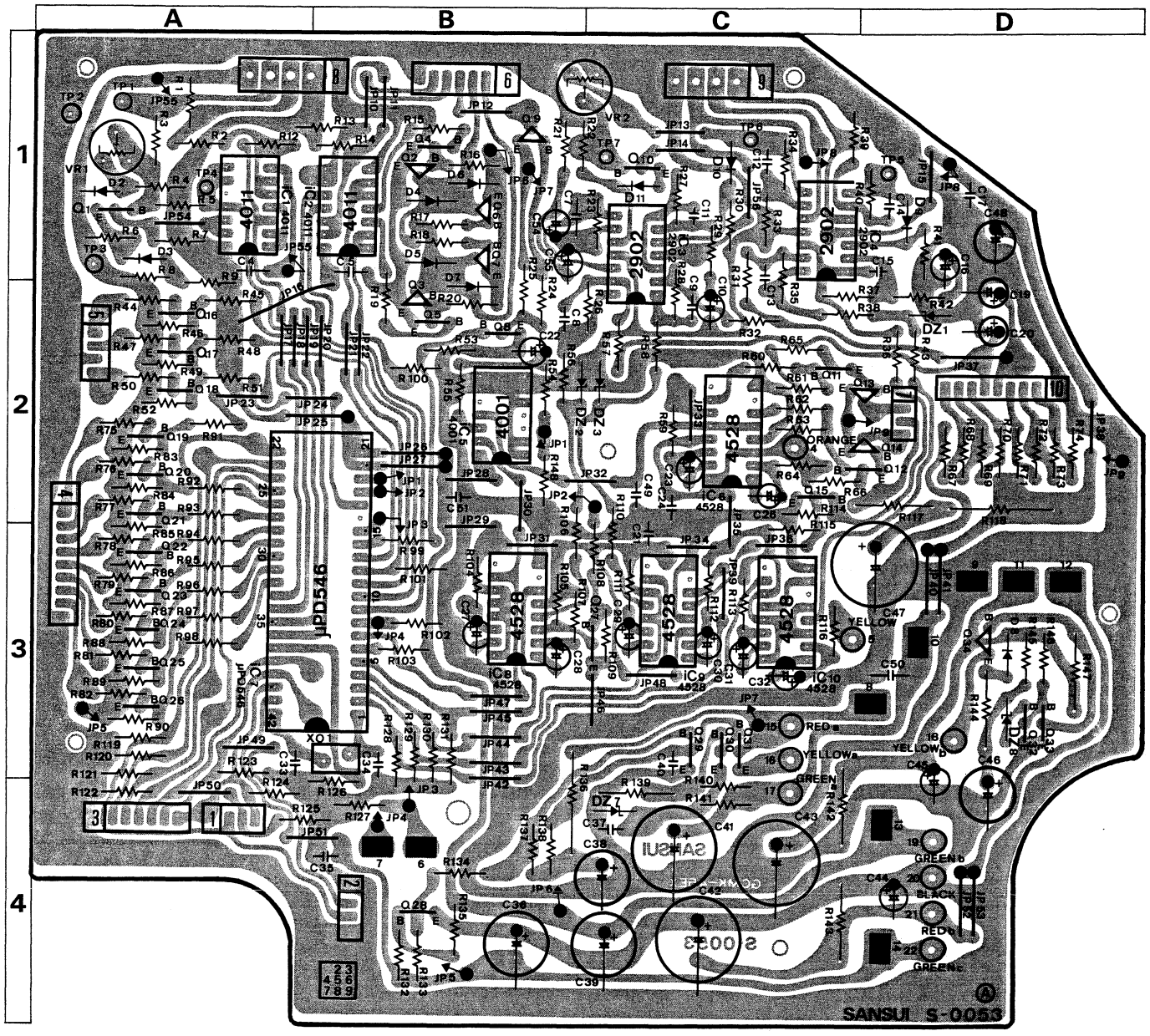
Note: In the lead-over grooves existing on a 70 mm-or-less from the center, the misplacing of the arm in detection position occurs inevitably.

4. PARTS LOCATION & PARTS LIST

•Since some of capacitors and resistors are omitted from parts lists in this Service Manual, refer to the new Common Parts List for capacitors & resistors.

4-1. S-0053 Control Circuit Board (Stock No. 13028101)

Component Side

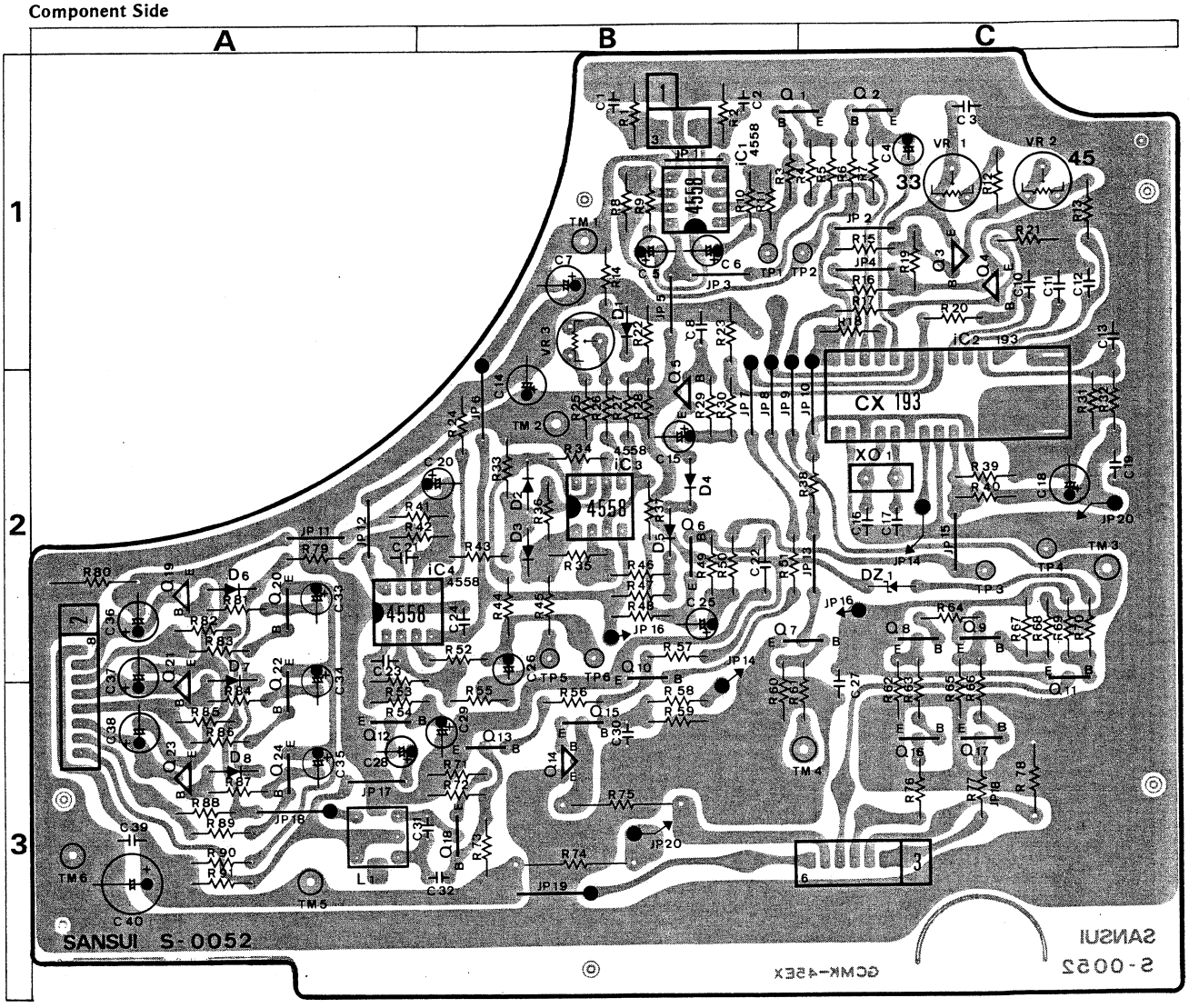


Parts List

Parts No.	Stock No.	Description
•Transistor		
Q1	07194800	2SC1815 Y
	03059501	2SC945 Q
Q2, 3	03069100, 1	2SC2060 P, Q
Q4, 5	07194800, 1	2SC1815 Y, GR
	03059501 ~ 3	2SC945 Q, P, K
Q6, 7	03012200, 1	2SA934 P, Q
Q8	03059501 ~ 3	2SC945 Q, P, K
	07194800, 1	2SC1815 Y, GR
Q9	03033601, 2	2SB560MP E, F
Q10 ~ 12	03059501 ~ 3	2SC945 Q, P, K
	07194800, 1	2SC1815 Y, GR
Q13, 14	03069100, 1	2SC2060 P, Q
Q15	07194800, 1	2SC1815 Y, GR
	03059501 ~ 3	2SC945 Q, P, K
Q28	07197001, 2	2SA733A Q, P
	07194700, 1	2SA1015 Y, GR
Q29	03059501, 2	2SC945 Q, P
	07194800, 1	2SC1815 Y, GR
Q30, 31	03059501 ~ 3	2SC945 Q, P, K
	07194800, 1	2SC1815 Y, GR
Q32, 33	03059502, 3	2SC945 P, K
	07194801	2SC1815 GR
Q34	03085901, 2	2SD471 L, K
•IC		
IC1, 2	07207200	MB84011BM
	03604100	TC4011P
IC3, 4	07205200	NJM2902N
IC5	03609500	MSM4001RS
	03610500	TC4001BP
IC6	03612900	TC4528BP
IC7	07201000	μPD546-150
IC8	03612900	TC4528BP
XO1	09300700	Ceramic OSC
•Diode		
D2	03111600	1S2473D
D3	03401200	VD1212
D4 ~ 7	03111600	1S2473D
D8	03103400	10D1
D9 ~ 11	03401200	VD1212
D12	03111600	1S2473D
•Zener Diode		
DZ1 ~ 3	03157200	EQA01-05R
DZ7	03166300	RD5.1E
DZ8	03164100	RD6.8E B
R118	00188400	270Ω 2W N.I.R.
R136	00190800	560Ω 2W N.I.R.
R144	00182100	330Ω 1W N.I.R.
VR1	10351500	22kΩ (B) B Sensor Adjust Volume
VR2	10351300	10kΩ (B) F Sensor Adjust Volume

4-2. S-0052 Motor Servo Circuit Board (Stock No. 13028001)

Component Side



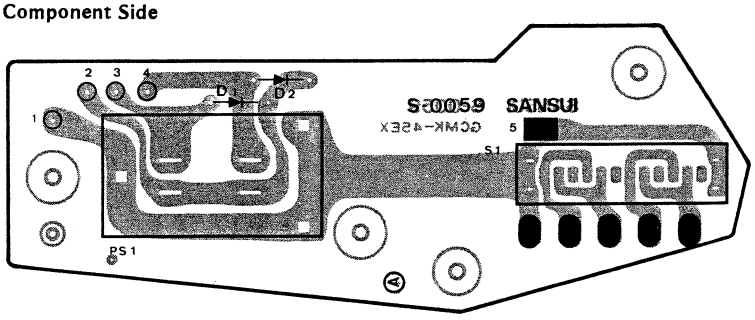
Parts List

Parts No.	Stock No.	Description
•Transistor		
Q1, 2	03059501 ~ 3	2SC945 Q, P, K
	07194800, 1	2SC1815 Y, GR
Q3	07197001, 2	2SA733A Q
	07194700, 1	2SA1015 Y, GR
Q4 ~ 13	03059501 ~ 3	2SC945 Q, P, K
	07194800, 1	2SC1815 Y, GR
Q14	03069100, 1	2SC2060 P, Q
Q15	03059501 ~ 3	2SC945 Q, P, K
	07194800, 1	2SC1815 Y, GR
Q16, 17	07197001, 2	2SA733A Q, P
	07194700, 1	2SA1015 Y, GR
Q18	03059501 ~ 3	2SC945 Q, P, K
	07194800, 1	2SC1815 Y, GR
Q19	03085901, 2	2SD471 L, K
Q20	07197001, 2	2SA733A Q, P
	07194700, 1	2SA1015 Y, GR
Q21	03085901, 2	2SD471 L, K
Q22	07197001	2SA733A Q, P
	07194700, 1	2SA1015 Y, GR
Q23	03085901, 2	2SD471 L, K
Q24	07197001, 2	2SA733A Q, P
	07194700, 1	2SA1015 Y, GR
•IC		
IC1	03607700	NJM4558D
IC2	03612800	CX-193
IC3	03607700	NJM4558D
XO1	09300600	OSC (3.6864 MHz)
•Diode		
D1	03111600	1S2473D
•Zener Diode		
DZ1	03164100	RD6.8E B
R12	00208900	47kΩ 0.25W M.R.
R13	00202600	150kΩ 0.25W M.R.
R74	00188400	270Ω 2W N.I.R.
R75	00190700	560Ω 2W N.I.R.
R78	00183700	56Ω 1W N.I.R.
R80	00181500	2.2Ω 1W N.I.R.
C4	00306800	1μF 50V E.B.
C21	00380300	10000pF 50V Ce.C.
C26	00306800	1μF 50V E.B.
L1	42905000	OSC Coil
VR1, 2	10343100	47kΩ B 45 r.p.m. PLL Adjust Volume
VR3	10350700	1kΩ B Speed Adjust Volume

- The circuit boards, S-0059, S-0054, S-0050, S-0042, S-0051, S-0057, S-0056, S-0045 S-0055, S-0060, S-0061, S-0039 & S-0058 are not supplied as the assembled, the individual parts on the circuit boards, however are provided for orders.

4-3. S-0059 Muting Circuit Board

Component Side

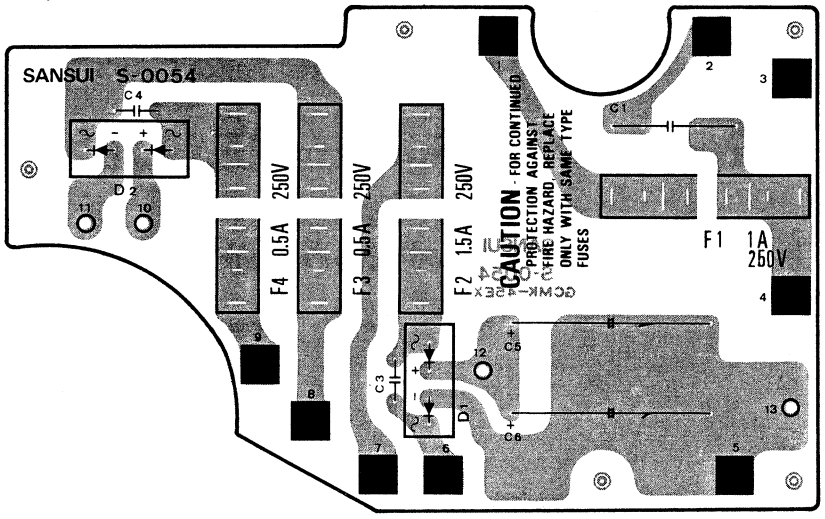


Parts List

Parts No.	Stock No.	Description
•Diode		
D1, 2	03103400	10D1
PS1a, b	07207600	Plunger
S1	07207800	Muting Switch

4-4. S-0054 Power Supply Circuit Board

Component Side

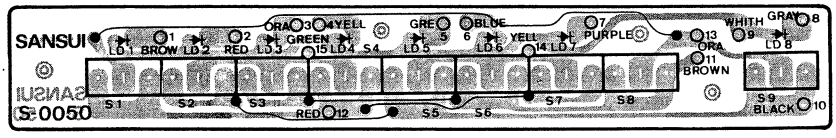

SANSUI S-0054
CAUTION - FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH SAME TYPE FUSES
F1 1A 250V
F2 1.5A 250V
F3 0.6A 250V
F4 0.5A 250V

Parts List

Parts No.	Stock No.	Description
•Diode		
D1, 2	03117000	RB-152
C1	00351200	0.033μF 250V M.C.
C3, 4	00407800	0.047μF 100V F.C.
C5, 6	00283400	470μF 50V E.C.
F1	07188400	AC Fuse 250V 1A
F2	07188500	AC Fuse 250V 1.5A

4-5. S-0050 Music Selection Circuit Board

Component Side

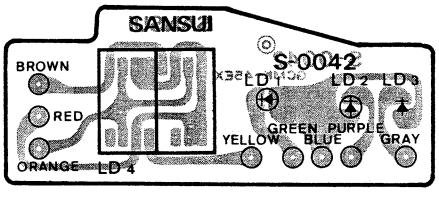


Parts List

Parts No.	Stock No.	Description
•LED		
LD1 ~ 8	03192900	AR3131D
S1 ~ 9	11320900	Music Selection Switch, push switch

4-6. S-0042 Indicator Circuit Board

Component Side

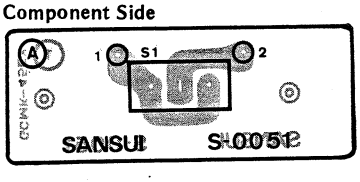


Parts List

Prts No.	Stock No.	Description
•LED		
LD1	03194500	SLB-26GG1, CPU Indicator
LD2, 3	03190600	30 cm/17 cm Indicator
LD4	03194600	SL-1272, 33/45 r.p.m. Indicator

4-7. S-0051 Speed Selector Switch Circuit Board

Component Side

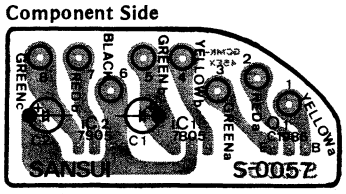


Parts List

Parts No.	Stock No.	Description
S1	11320900	Speed Selector Switch

4-8. S-0057 Regulated Power Supply Circuit Board

Component Side

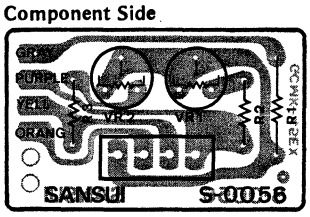


Parts List

Parts No.	Stock No.	Description
•Transistor		
Q1	03065401 ~ 3	2SC1986 O, Y, G
•IC		
IC1	03609200	FS7805M
IC2	03613900	FS7905M

4-9. S-0056 E/F Sensor Adjusting Circuit Board

Component Side

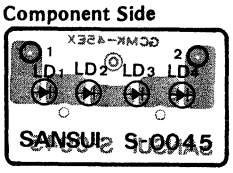


Parts List

Parts No.	Stock No.	Description
R1	00184400	680Ω 1W N.I.R.
VR1, 2	10354500	220kΩ B E/F Sensor Adjust Volume

4-10. S-0045 Strobo Circuit Board

Component Side



Parts List

Parts No.	Stock No.	Description
•LED		
LD1 ~ 4	03194400	

4-11. S-0055 Delay Adjusting Volume Circuit Board

Parts List

Parts No.	Stock No.	Description
VR1	10352300	470kΩ B Relay Adjust Volume

4-12. S-0060 E/F Sensor Switch Circuit Board

Parts List

Parts No.	Stock No.	Description
•LED		
LD1	07205900	LD261
•Photo Transistor		
Q1, 2	07205800	BPX81

4-13. S-0061 B Sensor Adjusting Circuit Board

Parts List

Parts No.	Stock No.	Description
VR2	10353500	4.7kΩ B Sensor Adjust Volume

4-14. S-0039 Start Stop Switch Circuit Board

Parts List

Parts No.	Stock No.	Description
S1, 2	11907000	S/S Switch & Lifter Switch

4-15. S-0058 Sensor Adjusting Circuit Board

Parts List

Parts No.	Stock No.	Description
S1	11103100	Sensor Adjusting Volume, slide switch

• Abbreviations

C.R. . . . . Carbon Resistor
S.R. . . . . Solid Resistor
Ce.R. . . . . Cement Resistor
M.R. . . . . Metal Film Resistor
F.R. . . . . Fusing Resistor
N.I.R. . . . . Non-inflammable Resistor
C.C. . . . . Ceramic Capacitor
C.T. . . . . Ceramic Capacitor, Temperature Compensation
E.C. . . . . Electrolytic Capacitor
E.L. . . . . Low Leak Electrolytic Capacitor
E.B. . . . . Bi-Polar Electrolytic Capacitor
E.BL. . . . Low Leak Bi-Polar Electrolytic Capacitor
Ta.C. . . . . Tantalum Capacitor
F.C. . . . . Film Capacitor
M.P. . . . . Metalized Paper Capacitor
P.C. . . . . Polystyrene Capacitor
G.C. . . . . Gimmic Capacitor

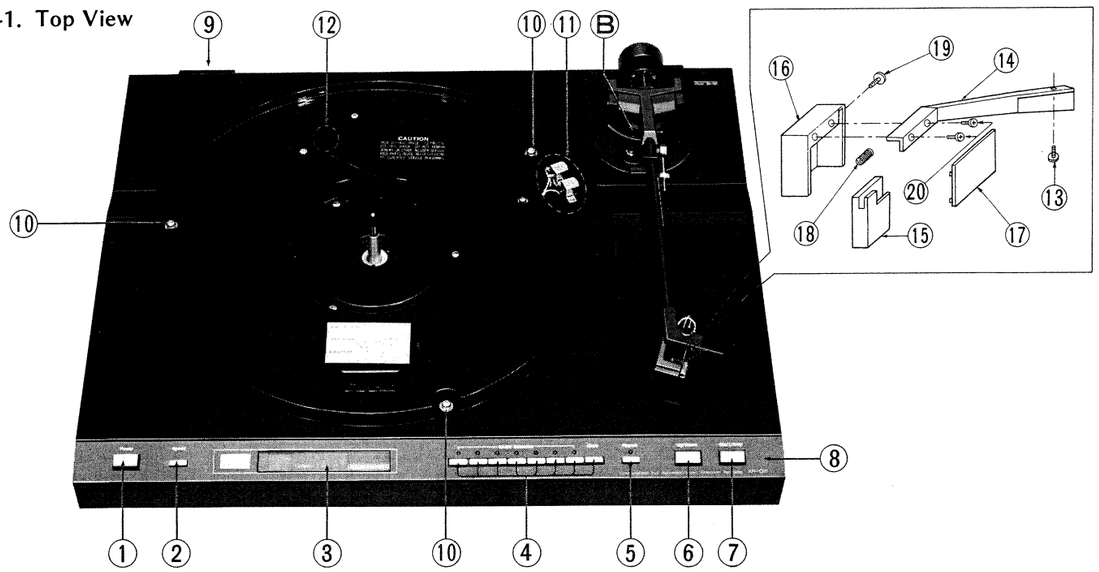
5. OTHER PARTS

Parts List <Top View>

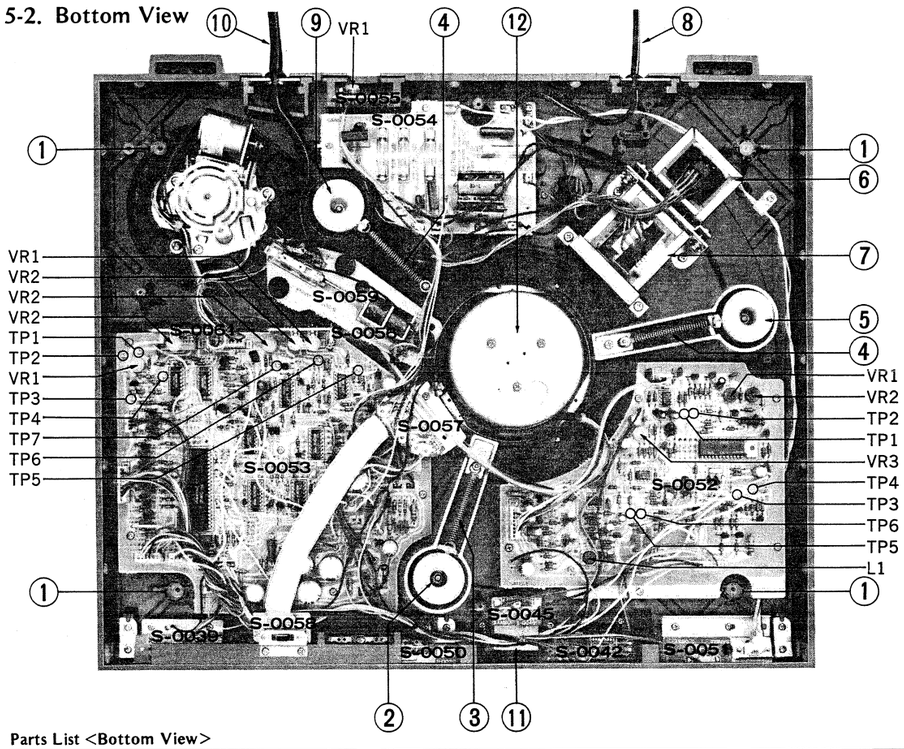
Parts No.	Stock No.	Description
1	07204000	Power Switch
	53922600	Knob Guide
	53222100	Knob, power switch
2	11321300	Speed Switch
	53222300	Knob, speed switch
3	53627700	Smoked Plate
4	11320900	Music Selection Switch
	11302400	Knob Guide
	53222300	Knob, music selection switch
5	11320900	Repeat Switch
	53222300	Knob, repeat switch
6	11907000	Up/Down Switch
	71021500	Push Knob Ass'y
7	11907000	START/STOP Switch
	71021500	Push Knob Ass'y
8	53627500	Console Panel
9	69035700	Hinge, dust cover

Parts No.	Stock No.	Description
10	00449900	Shipping Screw
11	45030400	Pulse Detecting Head
12	11907300	Voltage Selector
13	13030800	Screw M2 x 4, sensor holder
14	13023400	Sensor Holder
15	13028801	EF Sensor Ass'y, S0062 (Sensor Ass'y Circuit Board, Sensor Case, Sensor Mounting Plate)
16	13023210	Sensor Cover
17	13023500	Sensor Bottom Plate
18	13923600	Sensor Spring
19	13031000	Screw M2 x 8, adjusting screw
20	13030900	Screw M1.4 x 2, mounting screw
	70122500	Dust Cover Ass'y
	61122620	Platter
	55030200	Rubber Mat

5-1. Top View



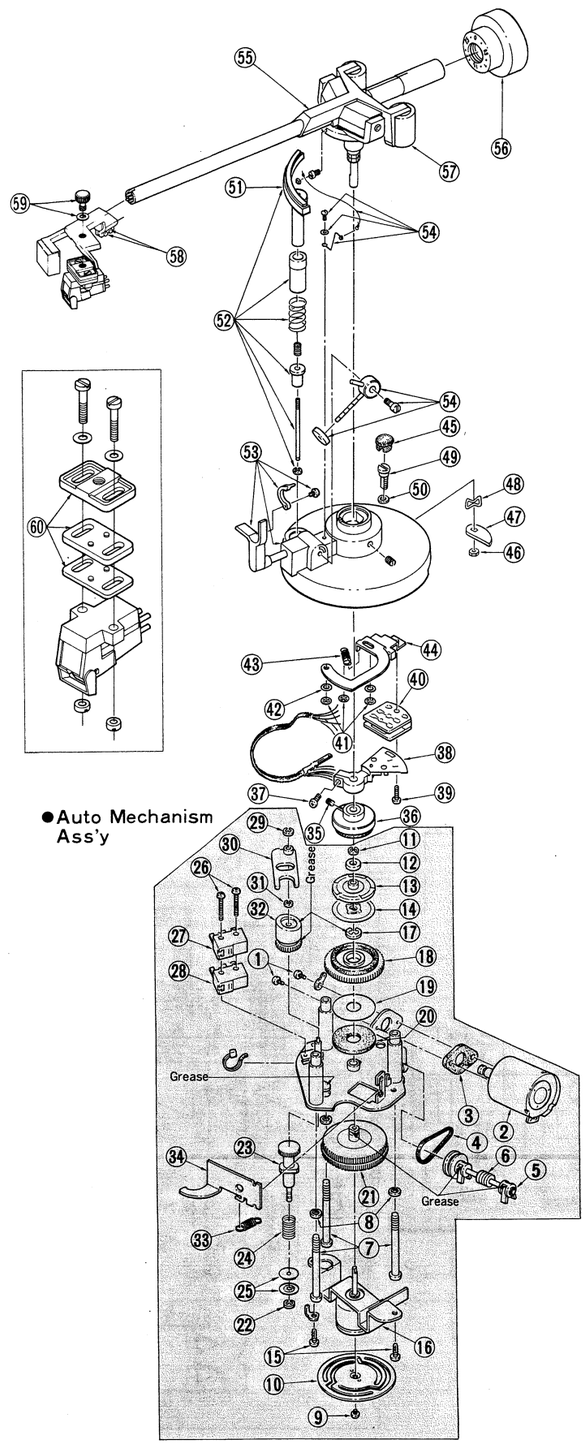
5-2. Bottom View



Parts List <Bottom View>

Parts No.	Stock No.	Description
1	55122210	Leg
	55221100	Felt Mat, leg
	51832400	Felt Washer
	51628900	PT Type Screw, M4 x 10
2	55122300	Damper Sheet
	69035520	Spring (B)
	55030400	Floating Damper
3	69035310	Tension Spring (B)
4	69035310	Tension Spring
5	55122300	Damper Sheet
	69035420	Spring (A)
	55030400	Floating Damper
6 (T-1)	15000201	Power Transformer
7 (T-2)	15000101	Power Transformer
8	38004700, 1	AC Cord
	39106000	Strain Relief
9	55122300	Damper Sheet
	69035620	Spring (C)
	55030400	Floating Damper
10	38103610	Output Cord
	13016300	Strain Relief
11	54420500	Strobo Miller
12	43207300	DD Motor

6. EXPLODED VIEW OF MECHANISM Ass'y & PARTS LIST



●Auto Mechanism Ass'y

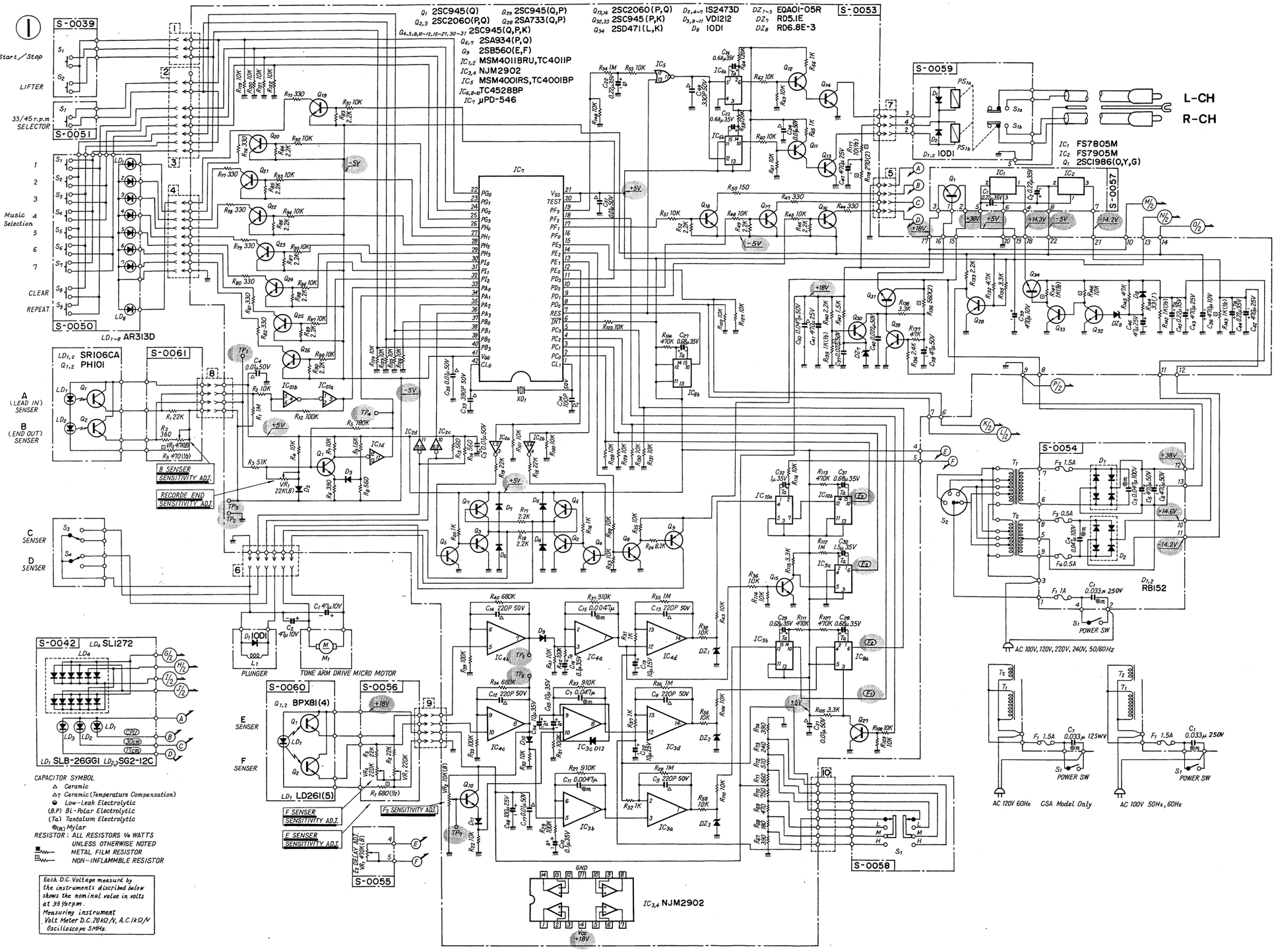
(Auto Mechanism Ass'y:Stock No. 18013101)

Parts List

Parts No.	Stock No.	Description
1	00436500	P Type Screw, M2 x 4
2	07207700	Micro Motor Ass'y
3	55029810	Rubber Cushion
4	60322310	Drive Belt
5	00488900	E Type Washer, D1.5
6	13011000	Worm Gear Ass'y (Worm Gear, Shaft E Type Washer)
7	07104600	Tapping Screw M4 x 40
8	51823300	S Type Washer M4 x 14
9	00436500	P Type Screw M2 x 4
10	61423700	Friction Disc
11	00489000	E Type Washer D2.0
12	51831700	Damping Washer (2)
13	64220830	Clutch Plate (2)
14	64220700	Clutch Plate (1)
15	00440900	PT Type Screw Type 2.3 x 8
16	43402400	Plunger Solenoid Ass'y
17	00489400	E Type Washer, D5.0
18	60020710	Gear (2)
19	51831500	Thrust Washer
20	51831610	Damping Washer (1)
21	13033800	Gear (1)
22	00489000	E Type Washer D2.0
23	13033900	Gear (3)
24	13033600	Compression Spring
25	13033700	Friction Pulley
26	00436600	P Type Screw, M2 x 16
27	11602700	Micro Switch
28	11602700	Micro Switch
29	00489000	E Type Washer, D2.0
30	65122000	Lifter Guide
31	00489000	E Type Washer, D2.0
32	13033200	Lifter Cam
33	13045200	Tension Spring (1)
34	64020310	Brakeshoe
35	51623300	SC Type Screw, M3 x 5
36	65121930	TA Drum
37	00440900	PT Type Screw 3 x 8
38	13008200	Screen Plate Ass'y
39	51628800	P Type Screw M2.5 x 10
40	07217900	Photo Sensor Ass'y
41	51831800	CR Ring M2.4
42	51832000	Thrust Washer 2.5 x 0.5
43	69034200	Tension Spring (2)
44	65030010	Sensor Mounting Arm
45	50624800	Lid
46	00463600	H Type Nut M3 x 2.4
47	60125600	Adjusting Cam (2)
48	51832100	Wave Washer, M4
49	62025710	Adjusting Cam Shaft
50	51823300	Thrust Washer 4.0 x 0.25
51	13022700	Lifter Plate Ass'y
52	13022800	Lifter Ass'y (Lifter Plate Ass'y, Cylinder, Elevation Spring, Absorber Spring, Lifter Chip Adjusting bar)
53	13022500	Arm Rest Ass'y (Arm Rest, Clamp, Clamp Fixing Screw, Fixing Screw)
54	13022600	IFC Ass'y (Weight, Bar (long), Bar (short), Thread, Washer, Screw, Thread Hanger)
55	13057800	Tonearm Ass'y
56	13057900	Main Weight Ass'y
57	13023000	Balance Weight Ass'y
58	13022100	Head Shell (A) Ass'y
59	13022200	Mounting Screw Ass'y
60	13024500	Cartridge Spacer Ass'y
	13022300	Lead Wire (cartridge)
	13010800	Cartridge Ass'y

- Design and specifications subject to change without notice for improvement.
- La présentation et les spécifications sont susceptibles d'éter modifiées sans préavis par suites d'améliorations éventuelles.
- Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.

7. SCHEMATIC DIAGRAM 7-1. Microcomputer Section



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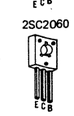
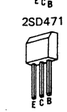
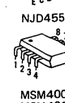
2SA733
2SB560



2SC2060



2SD471

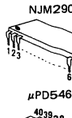


NJD4558

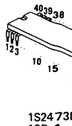
MSM4001RS
MSM4011BRU

TC4528BP

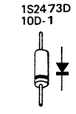
CX193



NJM2902

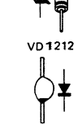


μPD546

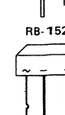


1S2473D
10D-1

RD6.8E
EQA01-05R
RD5.1E
RD6.8E-3

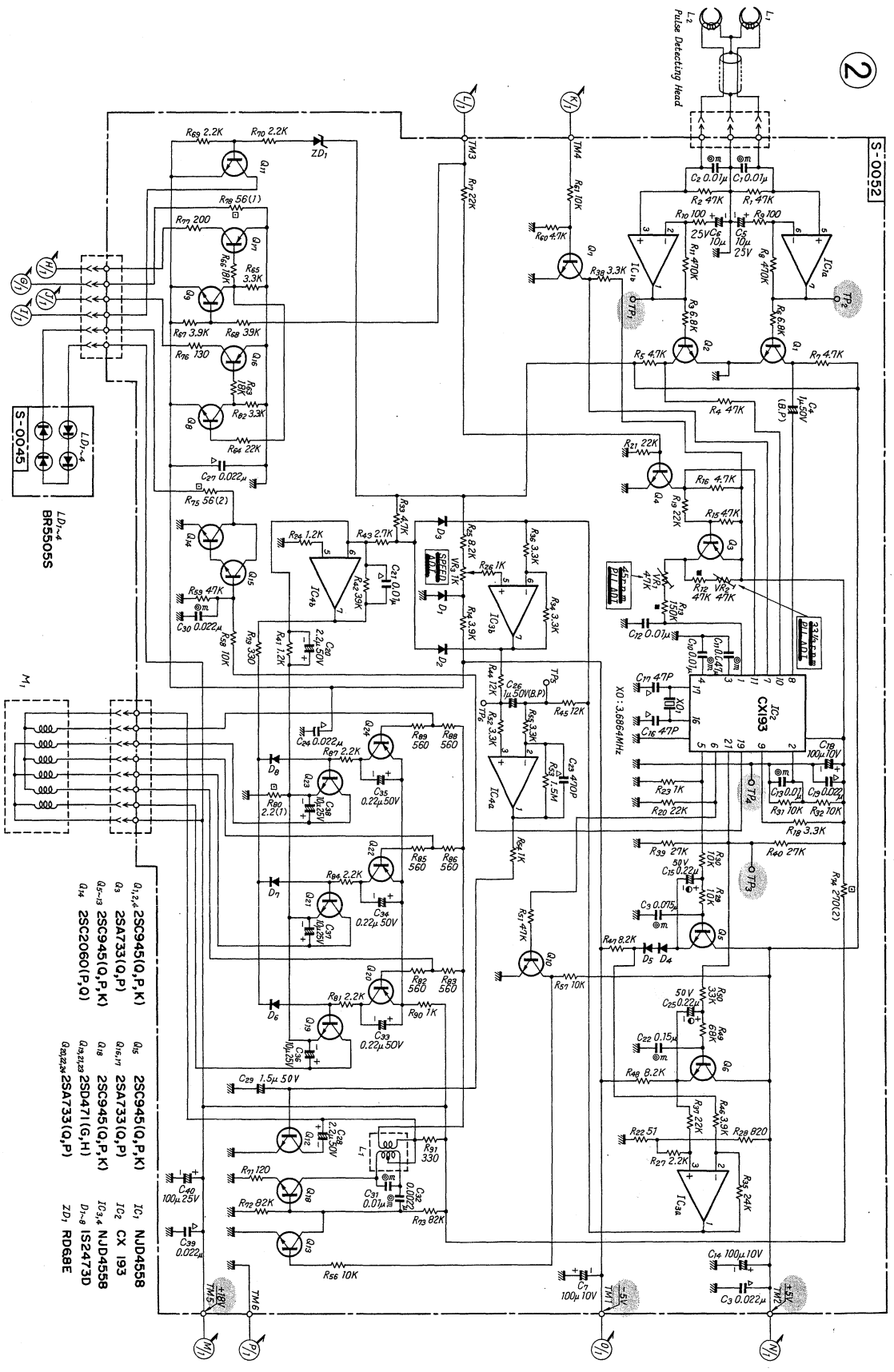


VD1212



RB-152

7-2. Motor Control Section



8. MAIN PARTS REPLACEMENT

8-1. Tonearm Assembly ⑤⑤ Replacement

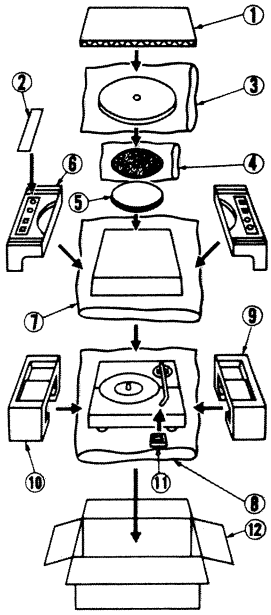
1) Remove the bottom plate.
2) Loosen three screws ⑦ to remove the mechanism assembly.
3) Loosen the fixing screw ⑤⑤ to remove the TA drum.
4) Loosen the screw ③⑦ to remove the slit plate assembly.
5) Remove the lead wire attached to the tonearm.
6) Remove a string of the inside force canceler ⑤④ .
7) Loosen the fastening nut to extract the tonearm.

* In installing the slit plate assembly, and TA drum assembly, refer to Figs. 3-1 (A) and (B), and Fig. 3-6.

8-2. Plunger Assembly ①⑥ Replacement

1) Remove the bottom plate.
2) Loosen three screws ⑦ to extract the mechanism assembly.
3) Remove the E type washer ⑪ .
4) Loosen two screws ①⑤ to remove the plunger assembly.

9. PACKING LIST



Parts No.	Stock No.	Description
1	90123900	Corrugated Board
2	90226600	Plastic Sheet
3	91166000	Polyethylene Bag, platter
4	91165200	Polyethylene Bag, rubber mat
5	90124000	Corrugated Board, platter
6	90227300	Inner Packing, (upper)
7	91163100	Polyethylene Bag, dust cover
8	91122710	Polyethylene Bag, turntable unit
9	90227410	Inner Packing, (right)
10	90227510	Inner Packing, (left)
11	90227910	Arm Packing
12	13026000	Carton Case

10. ACCESSORY PARTS LIST

Stock No.	Description
52432200	Cartridge Mounting Gauge
13010800	Cartridge Ass'y, SV-101B (including stylus, fixing screws)
13010900	Stylus SN-101
13012300	45 r.p.m. Adaptor
13057900	Main Weight Ass'y
92052100	Operating Instructions
13024400	Schematic Diagram
94060230	Polishing Cloth
13024500	Cartridge Spacer Ass'y
13059800	Lifter Height Checker
13060000	Screwdriver D62

Sansui

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